

MONTHLY WEATHER REVIEW,

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WAR DEPARTMENT,

Office of the Chief Signal Officer,

DIVISION OF

TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

INTRODUCTION.

The present Review is compiled from data furnished by 82 regular Signal Service Observers, 12 Canadian Stations, 5 U. S. Army Surgeons, 1 Naval Hospital, 259 Volunteer Observers of the Signal Service, newspapers and other records.

The chief characteristics of the month's meteorology have been: (1) The immense masses of drift-ice and the long-continued presence of icebergs in the North Atlantic, greatly affecting the weather in all the Atlantic States. (2) The comparatively high barometer in the Gulf and South Atlantic States. (3) The low temperature in the interior of the country and the Northwest. (4) The number and violence of local storms and tornadoes west of the Alleghanies. (5) Frequent frosts north of Virginia about the middle of June, which, in some localities, were seriously felt by farmers.

ATMOSPHERIC PRESSURE.

The mean monthly distribution of pressure is exhibited on Chart No. II. The high periodic pressure of the South Atlantic and Eastern Gulf States was maintained in June as usual. The lowest pressure is in the Northwest and Upper Lake region.

(1) *Areas of high barometer.*—These have not been so well defined; nor so extended in area, as those of the preceding or colder months; but probably exceed the usual June pressures. Several of these areas, on reaching the Atlantic coast, remained nearly stationary for several days, occasioning cool southeast winds.

I. The first marked area of high barometer, of June proper, became clearly developed on the 5th, as it then descended over the Northwest, moving in a southeastward direction. This area was preceded by cold northerly winds; which produced considerable rain-fall in the Mississippi and Ohio valleys, as also, when its chilling influence was felt, in the Gulf States. In the Northwest, the barometer rose half an inch or more above its normal June reading, and the temperature sank to an unusually low figure over the Mississippi valley and the country east of it. This area gradually worked its way toward Tennessee and the Ohio valley, and finally eastward to the Middle and South Atlantic coasts, which it reached by slow degrees. On the 8th, it was accompanied by high winds near and off Cape Hatteras. It also occasioned low temperatures for the Eastern Gulf and South Atlantic States, while it remained in their vicinity.

II. On the 12th, another area of high pressure began its progress from the Northwest, but its course was directed more duly eastward over the Lakes, and thence toward the upper Ohio valley. It remained nearly central, however, over the Upper Lake region during the 12th and 13th, when it moved toward the Middle Atlantic coast, attended by low temperature.

III. Another high pressure area was reported on the afternoon of the 17th, from the Upper Lake region, whence it steadily developed in a southeastward direction, though the crest of the wave remained nearly stationary over Lake Michigan. This area finally, on the 19th, is seen in a long, narrow band running from Lake Michigan to Virginia and North Carolina, after which it ceases to be of any importance.

IV. A small area of pressure, amounting to 30.20 inches, was formed on the middle Atlantic coast on the 20th, and remained nearly stationary, producing cool, southeast winds, until the morning of the 22d. It then disappeared in a southerly quarter.

V. On the 25th, another decidedly high pressure was reported from the Eastern Gulf and south Atlantic coast, where it continued nearly stationary till the 28th.

VI. On the 28th, a long area of high barometer developed in the Northwest and west of the Mississippi valley, occasioning a decided fall of temperature and considerable precipitation in its front. But the barometer readings were not very high.

VII. A seventh area of high pressure made its appearance in the Northwest on the morning of the 27th, and slowly worked eastward to the Lake region and the Ohio valley, producing cooler and cloudy weather, with considerable rain in the Ohio valley. This area was apparently but part of a more extensive one, central near Hudson's Bay, and which gradually extended on the 28th and 29th southward over New England and the Middle Atlantic coast. On the afternoon of the 27th, it occasioned a high and destructive tornado at Detroit and brisk winds generally on the Lakes. On Tuesday, the 29th, it occasioned severe local storms near Frederick, Maryland, and in southeastern Pennsylvania. This area, after reaching the Middle Atlantic States, slowly moved toward the South Atlantic coast.

VIII. During the 29th and 30th, another area of high barometer was formed in the Northwest and Lake region, reducing the temperature over the northern part of the country. As it progressed southeastwardly, its effects were very decidedly felt. But its history, &c., belong to the month of July.

(2) *Areas of low barometer.*—Only seven marked areas of low barometer were reported during the month, the barometric fluctuations having been of a more local character.

No. I. This first depression of the month appears in Nebraska on the morning of the 1st of June, accompanied by heavy rains from Omaha to Duluth. It progressed slowly during that day toward Lake Superior; and, by the afternoon of the 2d, it was central over that lake, attended by brisk northeasterly winds and rain, which extended to Lake Michigan. On the 3d and 6th it disappeared, without further noteworthy effect, north of the St. Lawrence valley.

No. II. On the morning of June 4th, a slight depression was visible in Kansas, preceded on its eastern side by cloud and occasional heavy rain. This depression, at first stationary, extended and progressed very slowly eastward during the day, and, on

the morning of the 5th, had apparently reached eastward to Indiana and Ohio. During the remainder of the latter day, it advanced rapidly to a point north of Lake Erie, and thence, on the 6th, without noticeable consequences, it passed down the St. Lawrence valley and off the coast of Maine.

No. III. First appears on Sunday, June 6th, in western Pennsylvania, where it was probably generated by the condensation and rain-fall of that day, due to the falling temperature in the northerly winds, preceding the high pressure area No. 1. This depression advanced with falling barometer due east off the middle Atlantic coast, with considerable rain and fresh northwest winds in the rear, on the morning of the 7th.

No. IV. Though formed on the 9th and possibly on the 8th, was not clearly defined till the evening of the 10th, when it was central in the far Northwest. It then began to move eastwardly, with light rains, towards Lake Superior, over which it became central in the afternoon of the 11th. It was then followed by high winds in the Northwest and on the Upper Lakes, the wind velocity at Duluth reaching 36 miles per hour, at 4.35 P. M. From Lake Superior, its course continued due east towards the St. Lawrence valley, which it attained on the forenoon of the 12th, accompanied on its southern sides by considerable rain-fall. During the evening and night of the 12th, it moved off the New England coast with the usual northwest wind and cooler weather in its rear.

No decided storm-centre of any magnitude or definite cyclonic character appears on the weather maps from the 12th till the evening of the 16th, when a slight barometric depression, No. V, is seen advancing from Nebraska toward the Mississippi river. Though scarcely distinguishable, it appears to have passed eastward very rapidly on the forenoon of the 17th, and on the afternoon of that day had become traceable in the Ohio valley. At midnight of the 17th, it was central in western Pennsylvania. But, in eight hours, it had rapidly moved eastward to the Middle Atlantic coast. On the 18th, it took a somewhat northerly course and approached the coast of Maine. Although the barometer was not unusually low, while the storm was within the observation of this office, after it passed north of Cape Cod, the pressure rapidly fell, and on the morning of the 19th, very high and dangerous winds were experienced at and near Eastport, Maine, and further to the northeast. Considerable rain also fell in the rear of this gale along the New England coast. As it approached Eastport, the barometer very rapidly fell, and, subsequently, the anemometer showed the high wind-velocity of 57 miles per hour.

No. VI. On the afternoon of the 23d, a depression of minor importance began its eastward progress from the Missouri valley toward Lake Michigan, which it nearly reached on the morning of the 24th, with occasional heavy rain-fall in the upper Mississippi valley. During the latter day it advanced eastward beyond the State of Michigan, and, during the night, passed to the St. Lawrence valley, whence, on the 25th, it disappeared to the northward.

No. VII was quite rapid in its progressive motion, having first clearly appeared on the afternoon of the 26th in northern Kansas, and thence moved across Iowa and the Lake region, reaching the St. Lawrence valley and New England on the morning of the 28th. It was followed by brisk northwest winds and rain, with decidedly cooler weather.

On the 29th a slight but indefinite depression appeared in the upper Ohio valley, and slowly disappeared amidst the considerable fluctuations of pressure due to diurnal changes of temperature, without noticeable results, associated with these barometric fluctuations.

3. *Tornadoes and severe local storms* were reported from various sections. Among the most prominent of these were the storms which visited Switzerland county, Indiana, on the 2d and 21st; Wythe county, Virginia, on the 25th; St. Joseph county, Indiana, on the 1st; Hardin county, Ohio, on the 2d; Adams county, Pennsylvania, on the 29th; Indianapolis, on the 1st and 2d; Quincy, Illinois, on the 14th; St. Louis, on the 18th; Omaha, Nebraska, on the 17th; Chicago, on the 22d; Dubuque, Iowa, on the 21st; North Platte, Nebraska, on the 26th; Detroit, on the 27th; and Philadelphia, on the 28th.

The tornado at Detroit was one of great violence and destructiveness in and around that city. Its path through the city was nearly north or north-northeast. It was apparently unaccompanied by electrical phenomena. Its rate of progress was irregular, sometimes appearing to stand still, and again moving with great velocity. Its duration was estimated at from three to five minutes, the length of its track a little more than a mile, and its width about one hundred and fifty feet. The vortitose motion was from right to left. It was first seen in the southwest as an exceedingly dark mass, with a violent whirling motion and a funnel suspended from it of the color of coal-smoke. In one or two localities it was attended by torrential rain, but generally it was a dry storm. There was considerable loss of life in its immediate vicinity; many houses were shattered beyond recognition.

This tornado was accompanied by terrific roaring, hissing and rumbling noises. It was preceded by hot and very oppressive weather for the four days previous. Three hours before its fatal stroke, it was preceded by a light shower of rain. The great outburst of the storm commenced about 6:15 p. m. of the 27th. This violent meteor was apparently not alone, but attended by others of minor importance in the immediate vicinity.

Hail-storms.—A severe hail-storm was reported from Bismarck, Dakota Territory, on the 23d, with stones from one-third to one-half inch in diameter; at Troy, Alabama, on the 12th; at Mt. Ida, Arkansas, on the 20th; near Detroit on the 27th; on the 2d, at Algona, Iowa, and on the 2d, 18th, 20th and 26th, at Leroy, Kansas; at Winchester, Kentucky, on the 6th; on the 12th, at Attaway Hill, North Carolina, and at several other points.

TEMPERATURE OF THE AIR.

The mean monthly temperature of the air will, as usual, be found in isotherms on Chart No. II, and in the table in the left-hand corner.

From these exhibits it will be seen that the temperature has been nearly normal for the Atlantic and Gulf States and Lower Lake region, but has fallen below the normal by nearly 2° in the Upper Lake region, the Ohio valley and Tennessee; and the upper Mississippi and lower Missouri valleys.

The lowest temperature has occurred on the coast of Maine, and the highest in the Southwest.

Frosts occurred very generally north of Maryland on the 13th and 14th. Frost was reported on the 14th from Oswego, Rochester and Buffalo, New York, Squam Beach, New Jersey, Portland and Mt. Desert, Maine, Florida and Springfield, Massachusetts, and many points in New York and Pennsylvania; on the 15th, in Pennsylvania and Vermont; on the 16th, from New Hampshire. The frosts of the 13th and 14th were quite heavy and damaging to crops. The frosts of the 13th were specially reported from New Market, Maryland, Freehold, New Jersey, and Fall river, Massachusetts. Light frost was reported from Wayne county, Pennsylvania, as late as the 21st.